

THE CALF MANUAL FOR MODERN AGRICULTURE



40FIT
TECHNOLOGY

PREFACE

The Board
Thomas & Markus Förster



DEAR READER OF OUR NEW CALF MANUAL

in this brochure we are pleased to introduce proven as well as novel recommendations on successful calf rearing, oriented toward calf-rearing professionals. At Förster-Technik, we have dedicated ourselves entirely to this single subject for 45 years. While in initial years, the primary focus was on time-saving measures, as time went on, the focus shifted to numerous innovations based on computer-monitoring of the animals. With the 40FIT approach, the purpose of which is to lay the proper foundation within the first 40 days of life, we now place the focus on the calf: its natural needs as well as what it requires to remain strong and healthy throughout its life.

Our company, with our 110 committed employees, develops and produces state-of-the-art, modern systems for calf management and feeding – making us

the global market leader and trendsetter in this sector. We accord great value to training and have a training ratio of over 15 %. It's an investment in our future that only makes sense: the apprentices we train today will form our highly-qualified teams of tomorrow. It's similar with calf rearing: in just a few years, your calves will be the most high-performing members of the herd; as such, we must regard all of the "next generation" as highly important.

This brochure is composed of five sections: Advantages of 40FIT, the first four hours after birth, the first 14 days, the next 40 days, and weaning. Förster-Technik offers perfectly adapted products for each of these phases; to make your life easier and improve the lives of your calves. Please visit our website for more detailed information.

We wish you much enjoyment in reading this brochure and every success with your calves.

Sincerely,


Thomas Förster


Markus Förster

PS:

Have comments or suggestions about this brochure? We'd love to hear from you by email: 40fit@foerster-technik.de

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	<p>COLOSTRUM. THE COUNTDOWN IS ON.</p> <p>A calf comes into the world defenseless, without an immune system sufficient to protect it from disease. The speed at which adequate antibodies are provided can thus be a matter of life or death. Every calf should therefore be fed a sufficient quantity of high-quality colostrum within the first four hours of birth.</p>	<p>p. 16-25</p>
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SUCCESSFUL CALF REARING WITH 40FIT



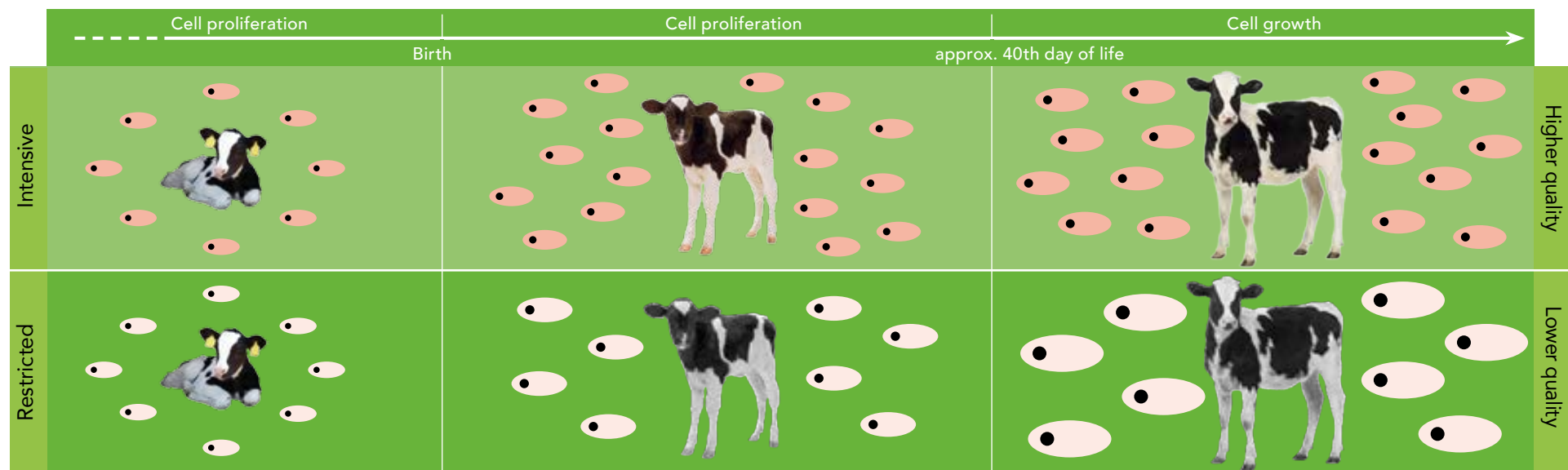
40FIT – BECAUSE THE FIRST 40 DAYS ARE DECISIVE!

The foundation is laid for the cellular composition of the organs in the prenatal period as well as in the first weeks of life. Within the first 56 days of life, calves should double their birth weight (VAN AMBURGH). Aside from growth rate,

the time at which growth occurs is a decisive factor for later growth capacity and yield potential. FIEBIG et al. successfully demonstrated as early as 1985 the different cell composition of the organs and influence of rearing inten-

sity on organ growth. This and other studies (KOCH, STEINHÖFEL) show that the maximum cell increase relative to body mass occurs in the first approx. 40 days of life. The foundation for optimal organ functioning for the rest of the

calf's life is therefore established during this critical early period. We therefore refer to the totality of measures for optimal raising during this period under the umbrella term 40FIT Technology.





SUCCESSFUL CALF REARING WITH 40FIT

FEED INTENSITY AFFECTS UDDER DEVELOPMENT.

Udder development is based on the foundation laid in early youth. With regard to the structure of the udder, BROWN et al. investigated the influence of various feeding intensity in two growth phases. In phase 1, up to the eighth week of life, one group received a "moderate" diet with dry matter intake of 1.1 % of body mass (BM). A second group received 2 % dry matter (DM) relative to BM.

Comparison of udder structures showed an advantage of 75 % greater udder weight and almost 3-times greater parenchymal ratio. Such udders are capable of significantly greater milk-synthesis performance. After weaning, improved udder structures could not be achieved despite then

intensive feeding. The prenatal and early postnatal nutrition level also influences the lifelong character of metabolic reactions in the body. The hormonal and enzyme concentration

therefore adapts to potential lack with the objective of offering the individual a greater survival advantage under these conditions. If individuals that have been "programmed" in this way are

exposed to sufficient nutrition or even more nutrition than necessary, they tend to exhibit metabolic disruptions, disease, fattening and reduced performance (KOCH and HAMMON, 2013, "Nutztierpraxis aktuell" 43/2012).

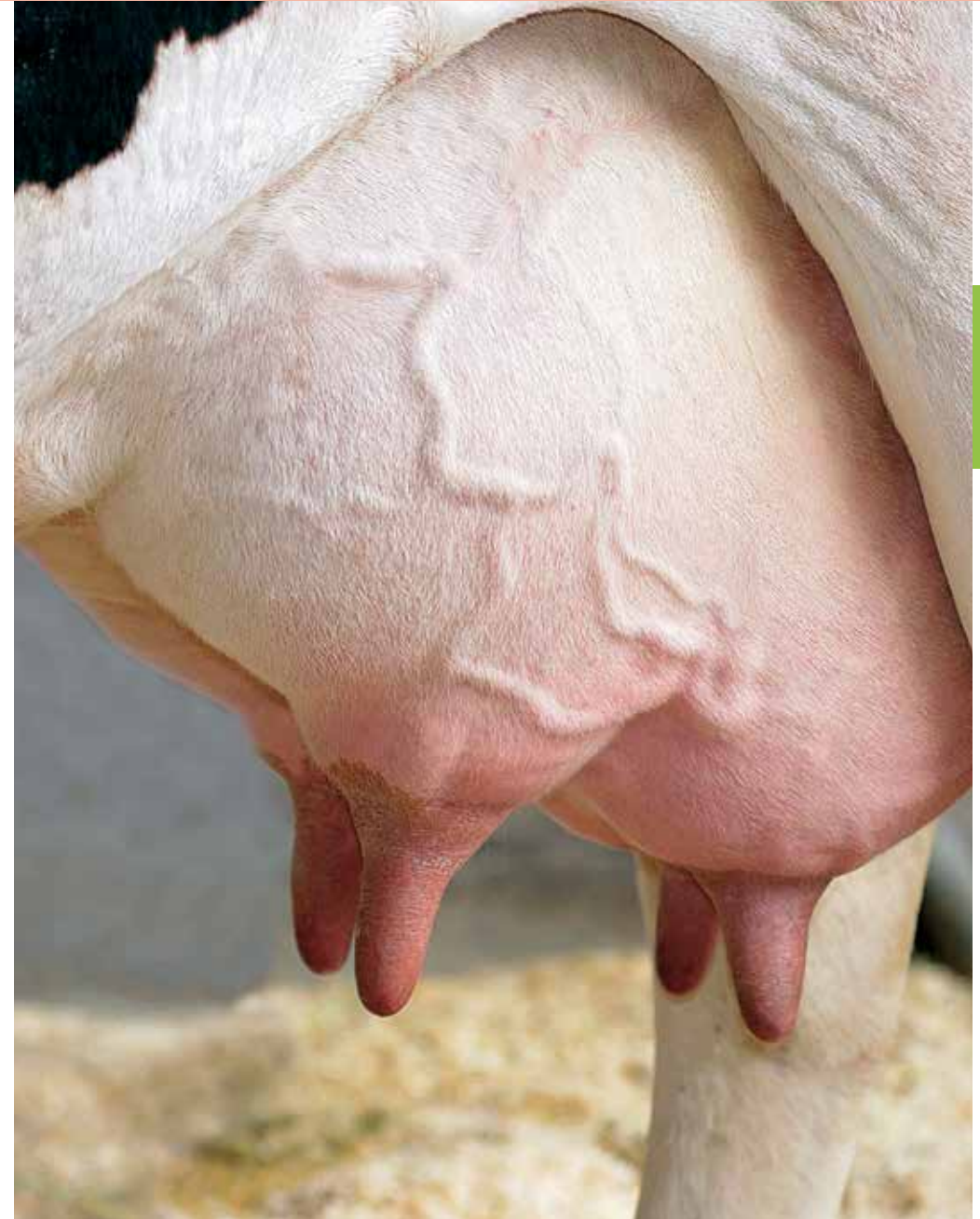
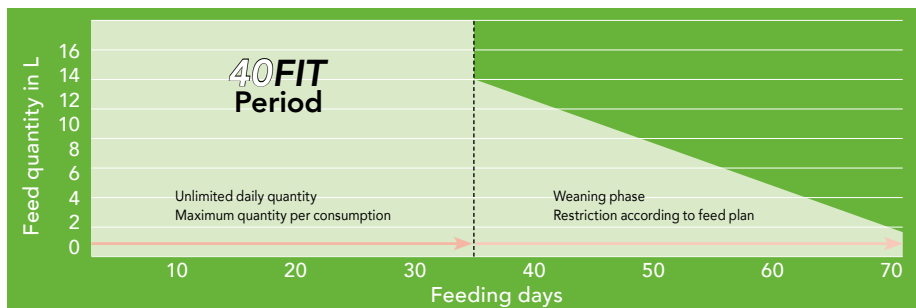
Many other studies come to the same conclusion regarding the long-term effects of nutrition level during the rearing period on the future milk yield of calves.

STUDY	RESULT
Foldager et al., 1997	+ 519 kg
Bar-Pedel et al., 1998	+ 454 kg
Ballard et al., 2005	+ 700 kg
Davis Rincker et al., 2006	+ 499 kg
Drackley et al., 2007	+ 835 kg
Chester-Johnes et al., 2009	+ 998 kg
Soberon et al., 2011	+ 849 kg
Mike van Amburgh	+ 1.285 kg
AVERAGE	+ 837 kg

40FIT FEEDING PLAN – SIMPLE, EFFECTIVE, SUSTAINABLE

The 40FIT feeding plan comprises a phase of controlled ad libitum feeding, followed by a weaning phase. The first period corresponds to the first 35 days and allows calves unlimited feed consumption, distributed throughout the day. Portion size control and blocked times between meal times protect the animals from pathological over-eating. This ensures maximum exploitation of

growth potential in the crucial first weeks of life. Weaning is then accomplished over 35 days by reducing the amount of feed from 12 to 2 liters per day. This prevents growth reductions and promotes rumen development. The developmental advantages manifest for the animal's entire life, forming the basis of improved vitality and enhanced milk yield.





SUCCESSFUL CALF REARING WITH 40FIT

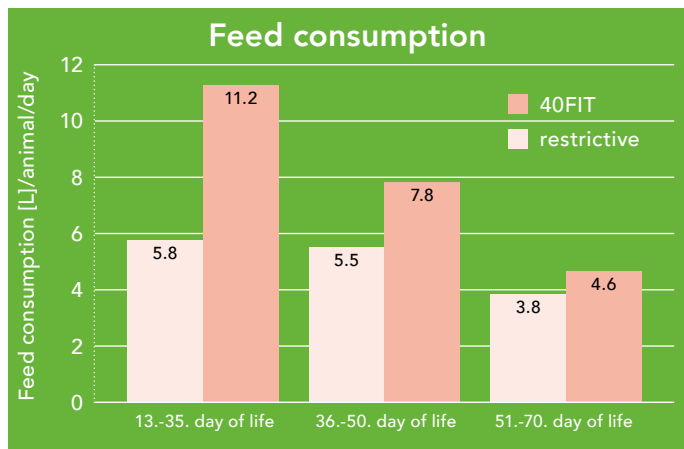


Fig. 1

Because they reach fertility weight earlier, calves fed according to the 40FIT plan have a better basis for high reproductive yields and longer productive life. With regard to illness, no consistent picture of illness frequency arises from the literature. The advantage of shorter illness duration, however, was demonstrated consistently along with less pronounced growth reductions in the calves fed according to 40FIT. If offered this amount, calves will consume 10 and more liters of milk per day, starting from the first week of life (Fig. 1). More than three feedings of

age-appropriate portions at an optimal feed temperature are required. This ensures optimal daily weight gain of 800 - 1,000g per day.

The feeding behavior of calves fed according to 40FIT differs significantly from that of pen companions fed restrictively. Demonstrated by JURKEWITZ as well as other authors (Hill, Hammon), restrictively-fed calves visit automatic feeders significantly more often, even though they are not permitted to feed (Fig. 2). This is the result of the hunger they are suffering from. The

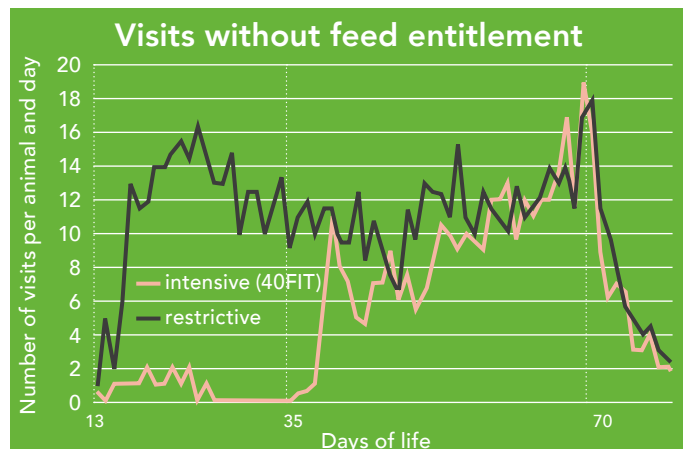


Fig. 2

40FIT calves are not confronted with this situation until they transition into the weaning phase, where reduced provision of energy and nutrients from milk can be compensated by starting to digest concentrate and roughage. When calves are spared the negative experience of not receiving milk at the teat and can decide independently when and how much to feed, they feed more slowly. As a result, saliva is more effectively mixed with the milk, improving digestion, and the sucking reflex dissipates by the end of feeding. Consequently, animals sucking and licking

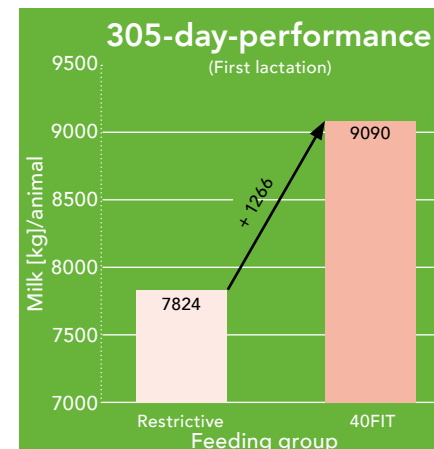


Fig. 3

the pen area hardly occurs at all.

B. Broghammer demonstrated that in the 305-day production of the first lactation, calves fed according to 40FIT exhibit a significant advantage of over 1,200 kg of milk compared to their pen companions fed rationed feed amounts (Fig. 3).

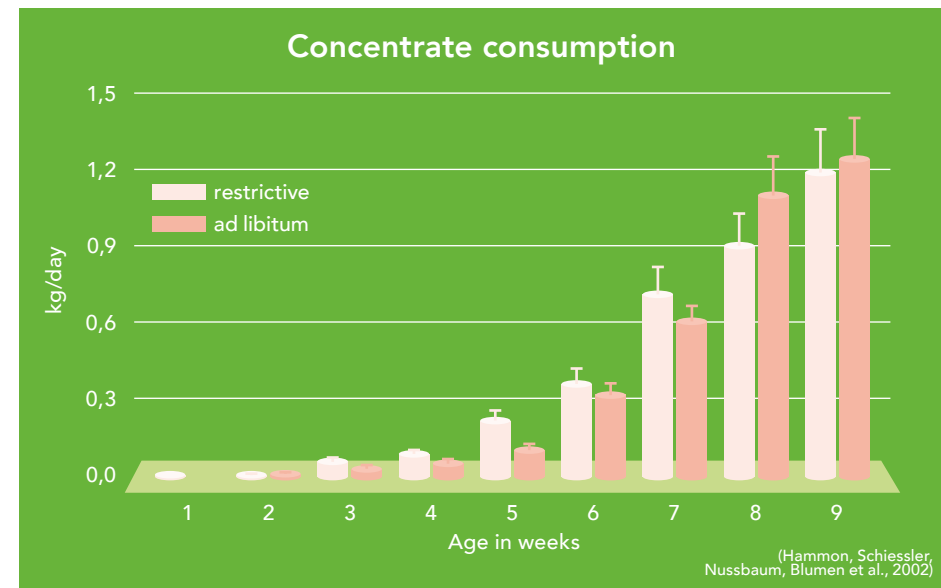
One of the reasons commonly cited for restrictive calf feeding in the first weeks of life and early weaning off milk relates to development of the rumen system. It was long accepted that

restrictively-fed calves start to consume and digest concentrate earlier, thereby more rapidly developing into better ruminants.

Since the microbial proliferation in the rumens, development of intestinal flora and formation of important digestive enzymes have not yet occurred, the calf must necessarily obtain sufficient supplies of energy and protein from milk or milk replacer. Plant proteins are not nutritionally effective and any quantities of concentrate and roughage consumed can make virtually no contribution to the organism's energy supply. Comparative experiments at different feeding levels (KUNZ, STEINHÖFEL, HAMMON, etc.) demonstrate that concentrate intake of restrictively-fed calves begins approx. 10 days earlier than with ad libitum feeding. Yet no measurable benefit for the nutrition of

calves aged two to four weeks can be derived from this, since they cannot yet productively digest plant proteins. The feed intake of intensively or ad libitum fed calves does not reach the level of those on restrictive feeding regimes until the 60th to 70th day of life. As a result of better cell composition of the digestive organs, these animals digest the feed better.

Water supply is a critical factor for proper rumen development. As demonstrated by KERTZ and NOCI, the rumen villi density falls rapidly with insufficient water consumption, since solid feed intake is reduced by up to 60% when insufficient water is offered. Aside from offering liquid and solid feed, calves should therefore also be offered fresh drinking water at all times in a pail or bowl. Sufficient water intake should not occur via a teat.





SUCCESSFUL CALF REARING WITH 40FIT



TIP:

- Calves fed according to the 40FIT feeding plan have a better foundation for good adolescent growth, fertility and high milk productivity, as well as health and vitality. Consequently, longer productive life and better life yield and effectiveness can be expected.
- Feeding in the early feeding period should be oriented to attain daily weight gain of 800 -1,000g. For this purpose, whole milk (with or without supplements) or high-quality milk replacer in sufficiently high concentration (at least 12.5 % DM) and quantity is suitable. Plant proteins cannot be digested by calves in the first two weeks of life and should therefore be avoided during this time.
- Compensatory growth in later adolescent development, from weaning to fertility, results in lower cell composition of organs and a tendency to store larger amounts of fat and water.
- High dry matter intake (more than 1.1 kg/animal per day) in the feed helps to avoid stress and promotes regulatory mechanisms related to environmental adaptation and overcoming illnesses.
- Intensive or ad libitum feeding promotes good rumen development and high feed absorption.
- Fresh drinking water must also be available at all times, in addition to the feed.
- Offering concentrate for free intake is recommended no later than the second week of life. From the fifth to sixth week of life and intake from approx. 400g per animal per day, concentrate and roughage intake make a decisive contribution to nutrition.

WHAT DOES THE 40FIT TECHNOLOGY OFFER?

Innovative products and concepts that optimally support the growth of your calves from birth, that can also be used in existing calf feeders. This creates the perfect conditions for healthy, high-yielding, long-living cows and more efficient dairy farming.

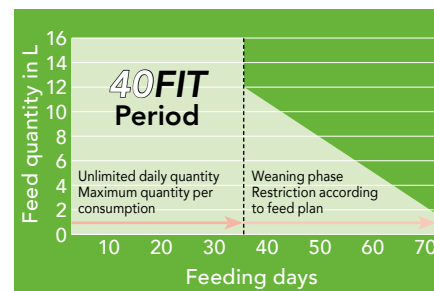
ColostroFIT – A strong start

The colostrum management system that enables you to provide your calves with high-quality colostrum immediately after birth.



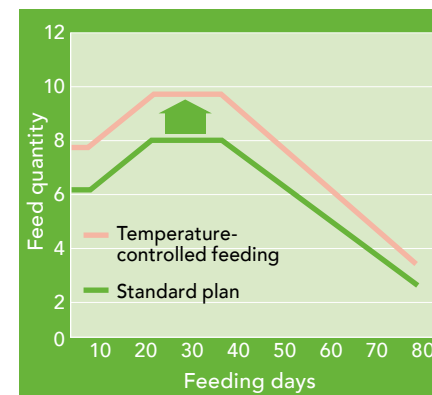
The 40FIT-Plan

The 40FIT Plan is an innovative feeding plan. During the 40FIT period, the calf is provided with the physiologically optimal feed quantity as desired. The subsequent weaning phase is controllable based on age, solid feed intake or weight gain. In cooperation with a 40FIT consultant, you can adjust the standard, pre-configured 40FIT Plan software individually based on your feeding strategy. This plan is then transferred to the automatic calf feeder, which ensures reliable and precise feeding.



Temperature-controlled feeding

During low winter temperatures, your calves need a lot more energy to keep their thermoregulation and immune systems up. Temperature-controlled feeding ensures that these increased demands are met. A temperature sensor in the antenna allows the feed quantity and concentration to be automatically adjusted to higher energy requirements.



CalfRail 2.0

Calves are often individually-penned for the first days of life. Frequent feeding is especially crucial in this period. With manual and mechanized bucket feeding, individualized feeding of calves in individual pens is not feasible for cost reasons.

With CalfRail, individually-penned calves can be automatically fed animal by animal, in small, freshly prepared servings up to eight times a day. This





SUCCESSFUL CALF REARING WITH 40FIT

sets the stage for wellbeing and health, optimal feed utilization, optimal ruminant growth and sustained output.

Animal monitoring and care can be flexibly integrated into the workflow. The calf feeder delivers the information required, such as e.g. feed consumption and feeding speed, at the push of a button.

Animal-specific weaning

There are great differences in individual animal development among young calves. These can be managed using concentrate-dependent weaning via an automatic concentrate feeder or weight-dependent via an animale scale



in the feeding station. The automatic feeder knows the daily portion for each one of your calves and gives them everything they need. After all, every animal is different.



Success together

The 40FIT Technology succeeds most dramatically only when technology and feed are optimally coordinated. Förster-Technik cooperates with leading producers of milk replacer and consulting services in order to offer farmers a harmonized feeding system. This enables the first weeks of life to provide the optimal start for future high-yield cows.



40FIT AT THE EG ZODEL AGRICULTURAL COOPERATIVE

FARM PROFILE

Assistant Facility Manager:
Yvonne Günther

LOCATION, STATE:

Neißeau / Saxony

FARMING TYPE

Animal production
(dairy cattle + breeding)
Plant production

ANIMAL BREED

Holstein

NUMBER OF DAIRY COWS

360

NUMBER OF CALVES PER YEAR

approx. 350

CALF FEEDING EQUIPMENT

One automatic feeder
for one CalfRail unit
One automatic feeder incl. 4 pump
units for 4 calf groups

40FIT EMPLOYED

since 2013

"After 25 years it was time to replace the calf feeder line. Previously the igloo calves had been bucket-fed with whole milk three times a day. Changing the feeding regime over to powder and introducing the new devices eliminated a lot of manual work. The best thing, though, is that the calves now get milk at a consistent temperature in the winter. The 40FIT program enables us to raise calves applying the latest scientific insights. With the new feeding regime, we were able to achieve optimal weight gain of 800 - 1,000 g in the first 100 days of life."

Dipl.-Ing. agr. Kai-Uwe Eisenhut
(management board member)





COLOSTRUM. THE COUNTDOWN IS ON.



COLOSTRUM MANAGEMENT WITH COLOSTROFIT

The immune systems of calves after birth

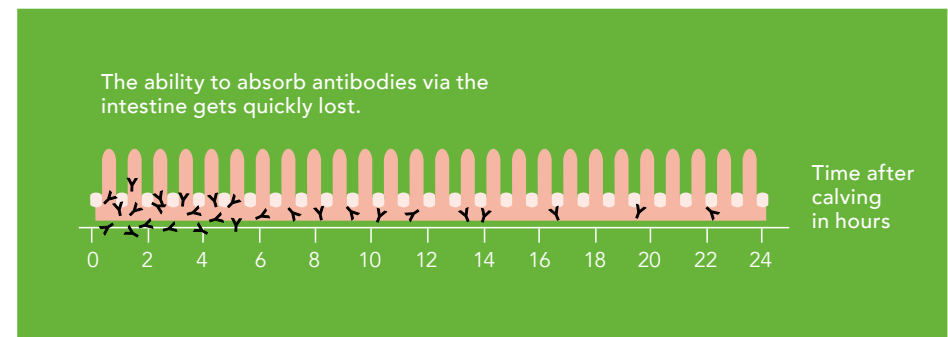
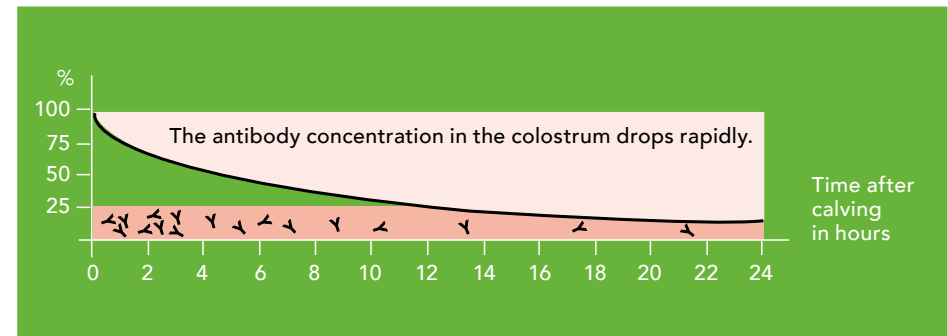
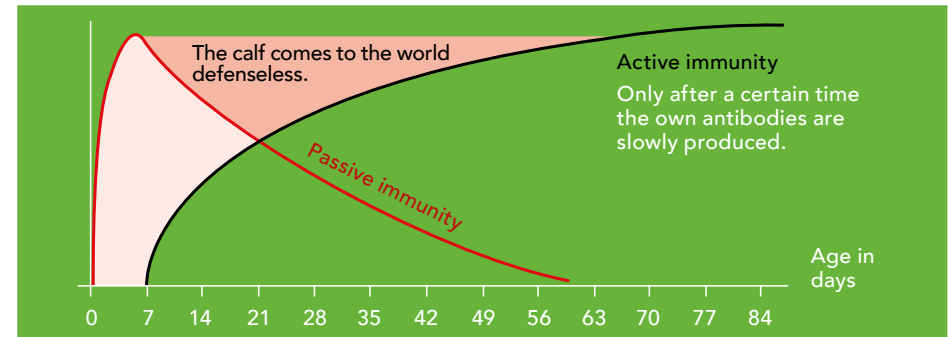
Different from other mammals, calves are born without any immunity at all. Activation of the immune system that produces the antibodies necessary to fight disease takes several weeks. To bridge immunization gaps during this period, the calf must take in antibodies from colostrum.

Colostrum antibody concentration

When milk begins to flow following birth, the udder releases the antibodies. The antibody concentration in the milk falls rapidly and after 24 hours is equivalent to only 25% of the initial level. It's

therefore crucial to milk out the first milk within the first four hours of birth. Maximum cleanliness is required to ensure the calf is exposed to the lowest possible pathogen levels in the colostrum.

Calves are only able to absorb the antibodies through the intestinal wall in the first hours after birth. As such, colostrum administration should ideally occur immediately after birth, and not later than within four hours. Any delay prolongs the period without immune protection while increasing pathogen exposure. The sooner the colostrum is administered, the better and more long-lasting is the passive immunization.





COLOSTRUM. THE COUNTDOWN IS ON.

ALWAYS CONSIDER COLOSTRUM QUALITY.

The immunoglobulin (Ig) content of colostrum varies greatly. To correctly estimate the quality, a quality control procedure using a colostrometer (spindle) or refractometer is indispensable. For sufficient antibody supply, the calf should absorb approx. 250g of immunoglobulin. Accordingly, depending on the quality of the available colostrum, each calf should be administered three to four liters of colostrum.

Aside from the absolute antibody content, the transfer into blood and local effects in the digestive tract is key to successful immunization. The time of administration as well as the pathogen level have a decisive influence on the antibody transfer rate. As such, cleanliness and hygiene must be strictly observed in preparing for birth and

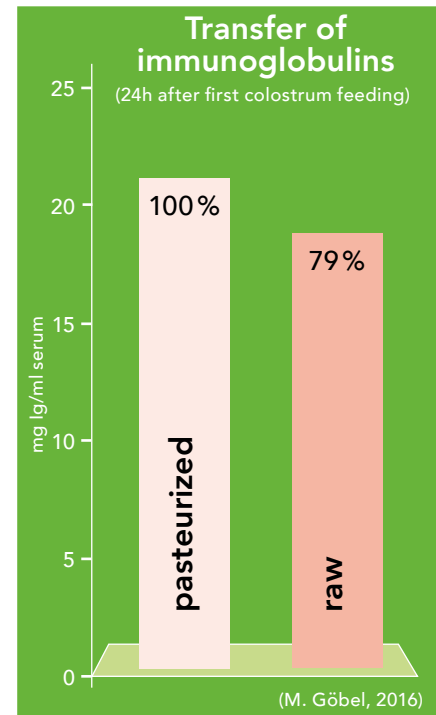
postnatal care, as well as in obtaining the colostrum.

Pasteurizing the colostrum is another effective means for improving its quality. Thanks to the killing of the germs in the colostrum, the antibodies pass better through the intestinal wall into the blood. Due to the separation of colostrum of poor quality and, in particular, the pasteurization, which lasts for some time (see page 20), it can no longer be worked mother-bound, i.e. the newborn calf receives high-quality, pasteurized colostrum from a previous calving. The colostrum, however, comes from the same barn, so that the necessary antibodies are contained against the pathogens present there. Thus, the advantages for an optimal start into life outweigh to mother-bound colostrum administration.



TIP:

The most important measure is the **timely supply of sufficient colostrum in high quality**





MONITOR EFFECTIVENESS AND HANDLING.



TIP:

- Criteria for good colostrum: obtained in the first hour following birth, or up to four hours afterwards
- Low pathogen count
< 100,000 KbE/ml and
< 10,000 KbE/ml coliform
- Must not be obtained from infected udders or cows on antibiotics.
- Should contain more than 55g Ig/l of colostrum.

To monitor the absorption status, it is recommended to take blood serum samples from 10 to 20% of the calves, however no less than 6 to 8 animals, to measure their immunoglobulin or protein content. 80% of measured animals should have a serum protein content of more than 54 g/l of blood serum and an immunoglobulin content of > 10g/l. Lower values indicate insufficient passive immunization and increased risk of illness.

With relatively little effort, sound colostrum management

- improves calf wellbeing
- reduces the frequency of illness and loss rate
- reduces the use of medications and therapy costs
- increases yield
- improves vitality, fertility, productivity and productive life of the cows.



COLOSTRUM. THE COUNTDOWN IS ON.

EASY. RELIABLE. PASTEURIZED

The colostrum is milked directly after birth, checked for antibody content and then placed into the single-use, aluminum bags known as ColostroBAGs – ensuring optimal hygiene with minimal effort.

Germs from the environment can cause diseases and thus cause economic losses. Especially when they are contained in the colostrum, they hinder the transfer of the antibodies into the blood.

In light of this, pasteurization is a key aspect of the ColostroFIT system, which significantly reduces pathogen load and improves the antibody blood transfer rate by 15%. With the ColostroMAT pasteurizer, one or two ColostroBAGs containing 3.8 liters of colostrum each are pasteurized in a water bath for 60 minutes at 60°C. The pasteurized colostrum can be stored in the ColostroBAGs in the refrigerator for five days or up to six months if frozen. This allows you to create a “colostrum bank” to ensure that every calf rapidly receives a portion of pasteurized colostrum.

The ColostroMAT also automatically thaws and warms the colostrum to the correct feed temperature.

The colostrum can then be administered to the calf by a teat or drench hose, if necessary. The handy caddy with backpack belt allows you to have both hands available to care for the calves. The extended teat hose with a rapid closure enhances practicality.



COLOSTROFIT

- gives you the tools you need for colostrum testing, pasteurization, storage and administration.
- gives you a clear sequence of tasks.
- is simple to use.
- is rapid.
- is hygienic. → Single-use aluminum bag for maximum hygiene
- is biologically ensured by pasteurization.
- is economical due to the reduced risk of illness, lower veterinarian costs and improved milk production over the long-term.





COLOSTRUM. THE COUNTDOWN IS ON.



THE COLOSTROFIT PRODUCT RANGE.



ColostroMAT

Compact pasteurizer for gentle warming and pasteurizing of colostrum in the special, aluminum ColostroBAGs. With four control keys and automatic process control for all aspects of pasteurization, cooling, warming and cleaning, the colostrum management system enables you to achieve better results with less effort.



ColostroBAG

This aluminum bag with a capacity of 3.8l is ideal for safe pasteurization, as well as proper storage and administration of colostrum. The aluminum facilitates rapid warming and pasteurization. For feeding convenience, a teat or drench attachment can be quickly and easily screwed onto the ColostroBAG.



ColostroKIT

Contains all of the necessary consumable materials to simply and gently fill, pasteurize, store and thaw the colostrum and to safely administer it to the calf. The kit includes aluminum bags, teats, teat holders and drench attachments.



Accessories

Caddy – this transportation aid is handy and indispensable; the backpack strap means both hands are available for calf care. The extended teat hose with a rapid closure enhances practicality.

BagFiller – handy and effective tool for convenient filling of ColostroBAGs.



COLOSTRUM. THE COUNTDOWN IS ON.



COLOSTROFIT IN USE BY THE HEIM FAMILY.

"To give all of our calves a perfect start to life and to give us clearly-defined work sequences, we decided to purchase a ColostroMAT. It allows us to pasteurize the colostrum and create a reserve bank of high-quality colostrum.

As the birthing process begins, we start up the ColostroMAT and warm the colostrum. We can now feed colostrum to the calves immediately after birth and are so pleased with our healthy animals, who start their lives with a lot of energy and strength".

Pascal Heim

FARM PROFILE
Farm Manager: Pascal Heim
LOCATION, STATE
Canton Solothurn, Switzerland
FARMING TYPE
Animal production (dairy cattle + breeding)
ANIMAL BREED
Red Holstein and Holstein
NUMBER OF DAIRY COWS
90
NUMBER OF CALVES PER YEAR
100
CALF FEEDING EQUIPMENT
ColostroMAT In use since: 2015

PRACTICAL TIPS



MILKING

Milk up to 8 liters of colostrum no later than four hours after birthing.

QUALITY TESTING

Test the antibody concentration with a spindle or refractometer. The content should be more than 55 g Ig/l of colostrum.

BAG FILLING

Fill and label without delay and contamination.

PASTEURIZATION

Pasteurize the colostrum in the ColostroBAG at 60°C for 60 min in the ColostroMAT.

COOLING/FREEZING

Store at 4°C, use within five days. Freeze at -15°C, use within six months.

THAWING/WARMING

Thaw in the water bath and warm to feed temperature (39°C).

FEEDING

Four liters in the first hour.

EFFECTIVENESS TESTING

Take blood sample and test it. 80% of the animals should have an immunoglobulin (Ig) content of > 10g/l.





INDIVIDUAL PENNING. DID YOU KNOW ...?

CALVES ARE USUALLY KEPT IN INDIVIDUAL PENS DURING THEIR FIRST TWO WEEKS.

Many farms keep their calves in individual pens mainly in their first two weeks. This form of penning is suitable to give the newborn calves the rest and attention they need at this time. Gloos, individual pens and huts are

used for penning; they can be thoroughly cleaned and disinfected before each new occupant moves in.

Smaller farms often cannot form homogeneous calf groups for auto-

matic feeders. Some time must pass before the calves are big and strong enough to hold their own against the others. To ensure that calves have sufficient energy available for healthy growth, it is important to feed them at

least three times daily. Depending on specific farm conditions, whole milk or milk replacer feed can be administered.

It is recommended to distribute the milk feed warm and freshly mixed in multiple portions throughout the day. The optimal feed temperature is 39°C.

For optimal calf feeding, i.e. frequently throughout the day, with precise feed temperature and concentration Förster-Technik offers mechanized as well as (fully) automatic solutions.



MilchMobil 4x4

Feeding by hand is not only time-intensive, it also takes a lot of work and energy. Moreover, milk transported over long distances in buckets rapidly cools off, especially in winter, and often arrives at the calf at a temperature that is too low.

Technical aids, such as MilchMobil 4x4, make it possible prepare feed simply and transport it quickly and conveniently to the calves. The calves can be monitored and observed during the daily feedings. Simple and intuitive operation makes the entire process much easier.

However, the amount of manual effort required to mix the feed, carry out the feeding process and clean all the equipment should not be underestimated.





INDIVIDUAL PENNING. DID YOU KNOW ...?

MECHANIZED FEEDING FOR INDIVIDUAL PENNING

MilchMobil 4x4

The new MilchMobil 4x4 from Förster-Technik makes it easier for you to mix, warm, transport and dispense the feed – and save a considerable amount of time.

It is available as a Combi model with a capacity of 120 and 200 liters and includes mixer, heater, tank cleaning function, user-friendly control unit, portion control, drive system and LED lamp as standard.

Horizontal tank with water bath

The horizontal tank affords ergonomic filling. Four wheels and a low center of gravity make MilchMobil 4x4 highly stable in motion. A heated water bath gently warms the milk and stores warmth as well so calves get the feed at the right temperature.

Cyclone cleaning

An integrated, rotating tank cleaning nozzle conveniently cleans the tank in a few easy steps at the push of a button, so MilchMobil 4x4 is ready to go again in no time.

Pendulum axle and steering

The four wheels of the MilchMobil 4x4 ensure optimal driving stability and, thanks to the pendulum axle, sufficient ground contact can be ensured, even on uneven terrain. The core of the new steering system is the specially developed axle steering system. Thanks to this, the MilchMobil 4x4 always follows the farmer and makes driving child's play.



MILCHMOBIL – DEPLOYED BY THE HÄRLE FAMILY

FARM PROFILE

Farm Manager:
Monika Härle

LOCATION, STATE

Ostrach/Baden-Württemberg

FARMING TYPE

Animal production
(dairy cattle + breeding)
Plant production

ANIMAL BREED

Holstein

NUMBER OF DAIRY COWS

250

NUMBER OF CALVES PER YEAR

240

CALF FEEDING EQUIPMENT

MilchMobil

ColostroMAT in use

since 2014

"We are very satisfied with our Milch-Mobil – it saves us a lot of time and effort."

Monika Härle, Ostrach





INDIVIDUAL PENNING. DID YOU KNOW ...?

AUTOMATED FEEDING FOR INDIVIDUAL PENNING

CalfRail 2.0

An intensive feeding period is absolutely necessary to give calves a good start in life and fully exploit the growth potential for high-yield cows. However, manual and mechanized systems employing feed buckets, for example, cannot meet the nutritional/physiological needs of calves with a reasonable amount of work.



On the other hand, CalfRail is a fully-automated solution for ideal feeding of individually-penned calves. CalfRail positions itself in front of each calf pen up to eight times per day, dispensing individual amounts to each respective calf in small, freshly prepared portions. Calves can be trained and fed via CalfRail straight after the colostrum feeding, creating the ideal conditions for optimal raising in the very first days of life.

CalfRail is controlled by, and supplied with feed in the form of milk replacer or milk, from the Vario automatic feeder. This saves farmers the work of preparing, transporting and administering feed, as well as that of manual cleaning of buckets and equipment. Animal monitoring and care no



longer need occur at fixed intervals. The automatic feeder delivers key data required for optimum calf management – such as feed consumption and drinking speed – at the push of a button. In this way, beginning immune reactions are often detectable before the appearance of visible symptoms.

Extensive monitoring functions support operational management, allowing tracking of calf development over the entire raising period. The data for individually-penned animals is naturally included in group penning and can be accessed via smartphone or tablet using the Calf-App or via PC using KalbManager.





INDIVIDUAL PENNING. DID YOU KNOW ...?

PRACTICAL TIPS



Ideal feeding based on animal needs:

- feeding multiple times daily, up to eight feeding times
- small, age-appropriate portions
- maintenance of optimal feed temperature
- feed is always freshly prepared at the time of feeding
- full dissolution and homogeneous mixing of all MP components
- feed intake initiated when the stand, with its teat arm, positions itself in front of the calf pen (Pavlovian reflex)
- controlled and monitored feed consumption, preventing over-feeding
- supports natural behavior (udder nudging)
- slower feed consumption, better saliva distribution and therefore better digestion.

This makes it possible for even very young calves to gently consume large quantities of milk daily. The result is that the animal's metabolism is programmed for high functioning; this exerts a lifelong positive effect on growth, milk and reproductive yield, as well as cattle vitality.

PENNING

Daily pen bedding and thorough cleaning and disinfection before a new occupant.

FEED

Use high-quality products (fresh milk or milk replacer) and administer at a constant feed temperature of 39°C. Also offer water and concentrate.

FEEDING FREQUENCY

At least 3x daily 2 - 3 liters, depending on age.

ACCUSTOMING

Accustom calves carefully and with sensitivity (2 to 3 times).

CLEANING

Clean and disinfect all tools daily.

MONITORING

At least 2x daily visual inspection of all calves and logging of results

FEEDING TECHNOLOGY

Mechanization with MilchMobil via teat bucket or automation with CalfRail

HYGIENE

Prevent contamination amongst calves. Wash hands frequently.

CALFRAIL IN USE AT THE KLUG GBR FARM

"Our calves receive colostrum for three days. They are then familiarized with the CalfRail and are fed 2.5 liters of feed five times daily. We decided in favor of CalfRail because the calf data can be easily accessed in the program, feeding times can be set precisely, feed temperature is always optimal and the precise feed quantity and concentration are always indicated."

Markus Klug



FARM PROFILE

Farm Manager:
Klug family

LOCATION, STATE:

Stendal, Saxony-Anhalt

FARMING TYPE

Dairy cattle with female breeding and feed growing

ANIMAL BREED

Holstein

NUMBER OF DAIRY COWS

250

NUMBER OF CALVES PER YEAR

240

CALF FEEDING EQUIPMENT

One automatic feeder for one CalfRail unit

CALFRAIL IN USE

since 2015





GROUP PENS. WHO LIKES TO EAT OR BE ALONE?



GROUP PENNING SAVES SPACE AND PROMOTES GROWTH

At larger dairy cattle farms, group penning of calves is the norm after the second or third week of life; it is practically universally recommended from the ninth week. It offers the following advantages:

- Corresponds to the physiological and ethological requirements of calves (conditioning through movement, social contact)
- Earlier and higher intake of concentrate and hay, more rapid development into ruminants and more rapid attainment of the raising objective
- Generally saves work and costs, since animals are more effectively fed and monitored, and less space is required than for individual penning
- Animals penned in groups keep themselves cleaner when sufficient bedding is provided.

Additional requirements for animal-appropriate group penning:

- 1:1 ratio of animals to feeding places with rationed feeding (with the exception of automatic feeders)
- Homogeneous groups in terms of age/body weight
- Functional dimensions adjusted to body size (Table 2)
- Separation of the functional areas of eating/moving and lying (two-area pens)
- Lying area with animal-appropriate micro climate
- Good overview for animal monitoring purposes, especially with large groups
- Roofing over the entire pen system, if possible
- Lying area should receive sunlight in the morning and shade when the sun is strong
- Restraint means available for treatments

	LG < 150 kg	LG 150-220 kg	LG > 220 kg
Depth single igloo (cm)	160-190		
Feeding place width (cm)	35	45	50
Lying boxes width (cm)	55	60	70
Neck rail height (cm)	60	65	70
Neck rail distance to the box edge (cm)	75	90	110
Feed aisle width (cm)	150	165	180
Lying surface requirements in two-area pen (m²)	1.3	1.5	1.7
Depth of an elevated feeding place (cm)	130	145	160

Table 2: Functional dimensions for calf housing

In experiments at the Köllitsch teaching and experimental facility, it has been determined that group penning even from the first day of life can have positive effects on daily weight increase when combined with feeding at combi automatic feeders. The grouping of very young calves requires the greatest possible age homogeneity. This approach has higher management requirements, however, because the young animals must be monitored more intensively in the group. That means that the age difference between oldest and youngest

calf should not be greater than 14 days. From an economical perspective, this approach is attractive because total space requirements for calf raising are lower and individual pen systems can be dispensed with. Intake of large quantities of mixed colostrum via the Combi automatic feeder reduces the need for milk replacer. It is recommended to feed the calves in the first seven to ten days with mixed colostrum. The immunoglobulins contained therein develop a local effect in the intestine and thereby reduce the risk of disease.



GROUP PENS. WHO LIKES TO EAT OR BE ALONE?

Pen space requirements

In the process of planning calf pens, it's important to provide sufficient pen places for the various age groups. The pen space requirement for calf raising depends on the following factors:

- Number of cattle and calving rate
- Distribution of calving throughout the year
- Proportion of calves to be sold
- Duration spent in the various pen units
- Reserve places and, potentially, additional units for allin/allout procedure with time standing empty

Source:

"Aktuelle Anforderungen für die Kälberhaltung,"
2008, Eilers [Aulendorf]



Calves that do not know each initially establish dominance relationships through individual confrontations and hierarchy battles. It is not advisable to change the social structure by adding or removing the animals.

Walking areas

The available walking areas are the place of social meeting, as well as urination and defecation. Feed and body care facilities (brushes) should be arranged here. They should be securely placed so that they cannot slip or fall. Different variations of concrete slatted flooring or areas made of concrete or poured asphalt are recommended for

the walking area. Rubber mats are also now used as a ground covering in walking areas. Hoof diseases are the third most common cause of loss of milk cows. It is therefore obvious that good hoof health must be promoted among calves and heifers as well. Different ground coverings in the lying and walking area ensure adequate hoof abrasion and hoof health. Hoof care should not be neglected among young cattle.

Walking pen

Penning in a walking pen provides generous areas for movement and intensive social contact. Less work is required on the part of farmers for feeding and dung removal. Since individual calves have different needs for lying, walking and feeding distances, the pen should always provide enough space for animals to pass around one another comfortably. Dead ends in movement

areas, into which animals with less hierarchy status can be driven, should be avoided.

Fully-slatted flooring is traditionally used in heat-insulated pens for young cow raising as well. Aside from the general problem of poor air quality, this is also associated with high heat loss through the slats, risk of tail tip injury with high occupancy and poor hoof health. Fully-slatted concrete flooring does not provide good lying comfort for any type of animal and is therefore not recommended, especially for raising young animals. Although deep bedding has the advantage that the straw-manure mat heat-insulates the lying area, it is only recommended in exterior climate-controlled pens. In heat-insulated pens, insufficient dissipation of the toxic gases at the height of the animals may otherwise occur fre-



quently. On the other hand, pens with bedded lying pens offering the same lying comfort have significantly lower straw requirements of 0.2 - 4 kg of chopped straw per animal, per day, (depending on season and age) than deep-bedded pens, which require 0.5 - 4 kg of straw per animal, per day in two-area pens.

Lying areas

The properties of the available lying area have special significance in cattle raising. Newborn calves spend about 90% of their time lying down; for adult cattle, the figure is still 50%. Rumination primarily occurs when lying down.

Regardless of the penning system, it should be ensured that the lying areas

offered correspond to the needs of the animals, as this is strongly correlated with animal wellbeing and yield. Studies show that animals select their lying spot according to the criteria of "soft" (malleable) and "heat-insulated." The soft beds usually made of wear-resistant rubber materials commonly available on the market or straw mattresses meet these criteria.

To keep the lying area dry, they should decline slightly toward the walkway, allowing urine to flow away more easily. Lying pens should offer open area around the head, to allow for the necessary swinging of the head when standing up. With regard to raising calves and young cattle, it must be remembered that they are growing animals. The dimensions of the required lying areas are necessarily determined by the different ages. Offering lying



GROUP PENS. WHO LIKES TO EAT OR BE ALONE?

pens as early as calf age is highly recommended. Animals can thereby familiarize themselves early on with penning in pens that provide both a lying and a walking area.

Comfort elements

Animals of all ages enjoy using brushes for body care and massage and should have free access to a salt lickstone.

Light and air

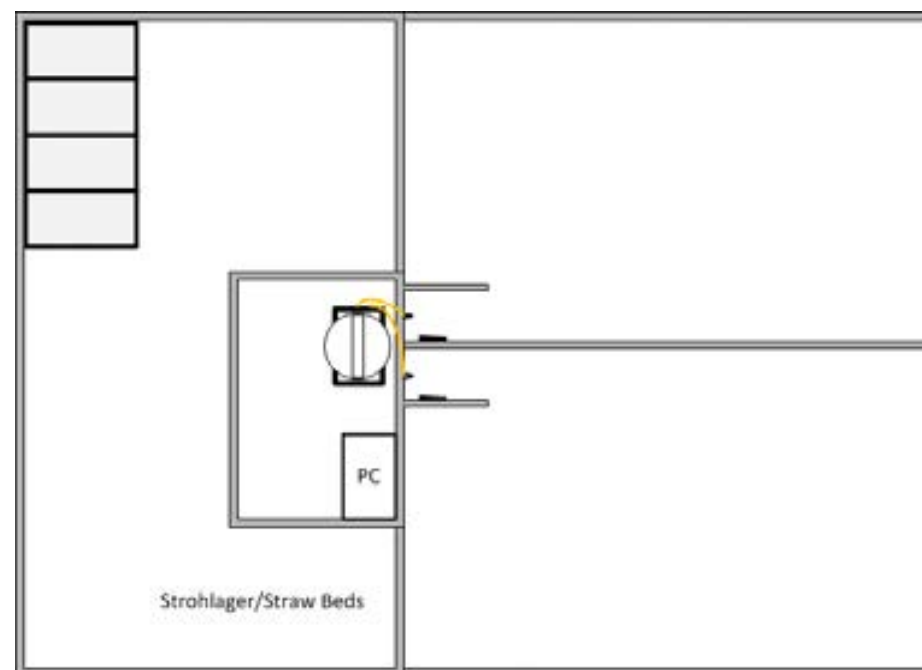
Exemplary pen design includes a comfortable, heat-insulated lying area and complementary area for movement. Moreover, an exemplary pen must also satisfy the needs for light and air. Ideal air circulation reduces the amount of pathogens and keeps any dust and toxic gas to a minimum. Dust

carries bacteria and is the primary cause of respiratory illnesses. The light situation should be adapted to the daily rhythm of life. However, too strong air drafts should be avoided.

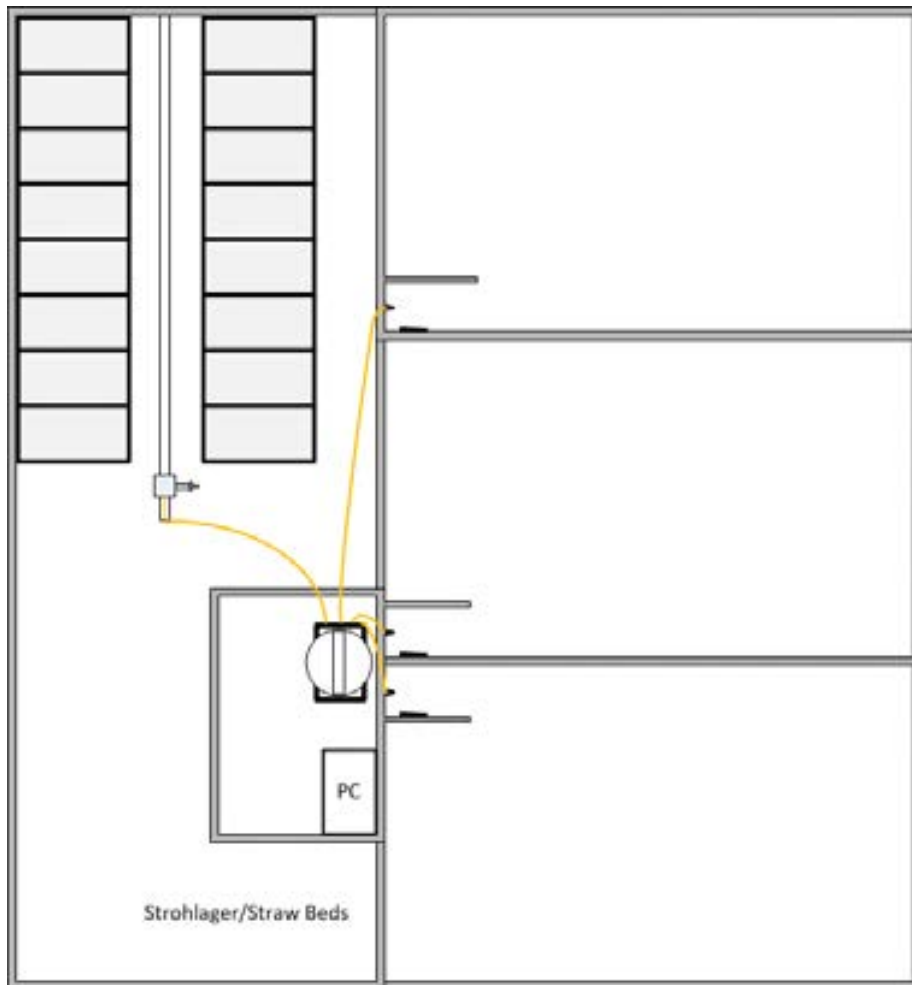
Barn design

Calf housing must take account of the requirements of the animals as well as those of management. In the case of new construction or reconstructive measures, a space offer of 3 square meters per animal should be planned in addition to the provisions of the animal welfare regulations. The process organization determines the number and arrangement of the required igloos, calf boxes and pens. The feeding and ventilation technology can be adapted to almost all requirements. The following examples can be duplicated as required.

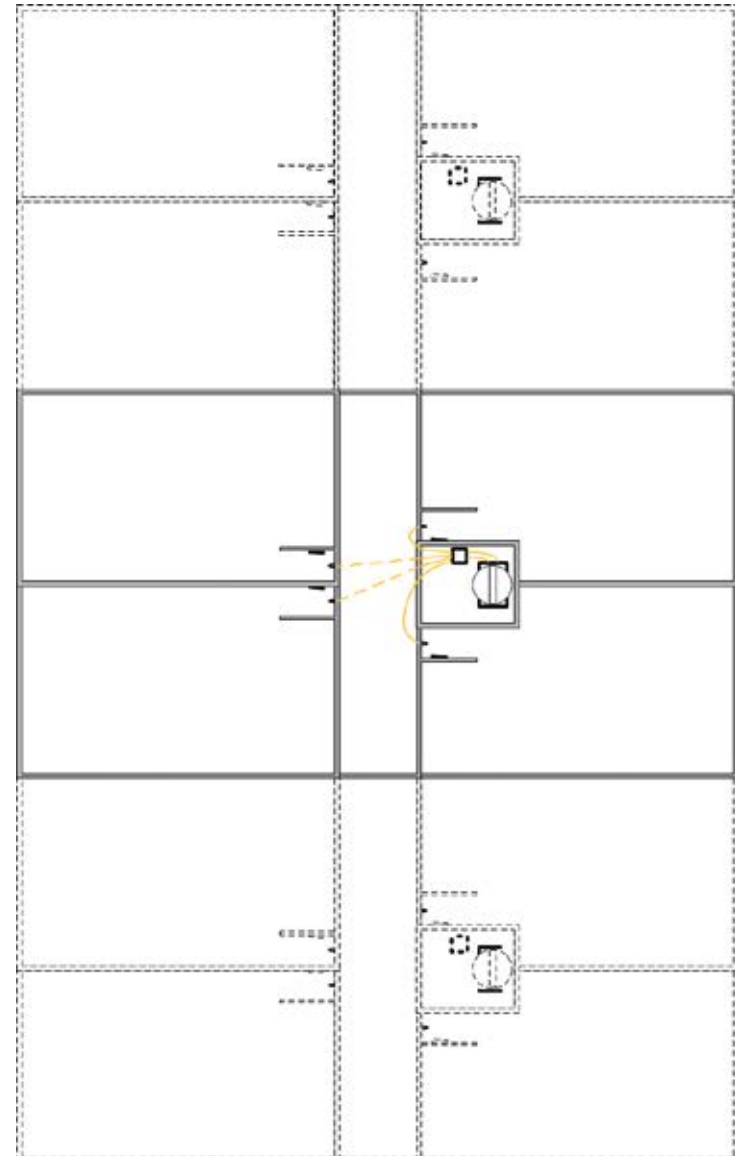
HOUSING EXAMPLE



Up to 100 calves/year: Four single and two group pens



100-300 calves/year: 16 single pens with fully automatic feeding with CalfRail and three group pens (allin/allout)



More than 300 calves/year: 4 group pens per automatic feeder with SynchroFeed 4-pump module



GROUP PENS. WHO LIKES TO EAT OR BE ALONE?



EVERYTHING FROM A SINGLE PROVIDER – FOR OPTIMAL CALF REARING.

VARIO & COMPACT smart Automatic feeders

Modern calf rearing primarily employs feeding systems with individual animal recognition functionality. Animals are identified by transponders on the collar or electronic ear tags, and fed according to the farmer's instructions. The feed is always prepared at the correct temperature and concentration, and is dispensed to each animal individually in age-appropriate portions. An appropriate model is available for every size of farming operation.

The COMPACT smart automatic feeder makes it easy to get started with professional calf feeding. The COMPACT

smart takes charge of preparing and administering feed for up to 50 animals, which makes it ideal for farms with up to 100 cows.

The top-line VARIO smart automatic feeder is equipped with high-performance components and can reliably feed up to 120 animals simultaneously at 4 feeding stations. It is best suited for dairy farms with the highest standards for calf rearing.

With the automatic feeders, you can program up to four different feeding groups. This allows you to feed your female calves differently than your bull calves. Each group has its own feeding

plan with individually adjustable feed quantities and feed days, as well as plans for variable concentrations of milk replacer and milk ratios.

You can choose between three automatic feeder designs:

- "Powder" for dispensing milk replacer feed.
- "Combi" for dispensing milk replacer feed and fresh milk.
- "Fresh milk" for dispensing exclusively fresh milk.

With the right equipment, you can make your automatic feeders into a complete feeding and management system to meet the highest standards.

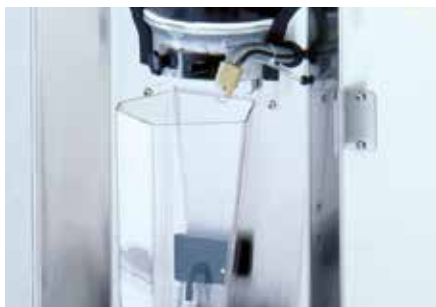


Additional equipment
• Fly protection
• Stainless steel model



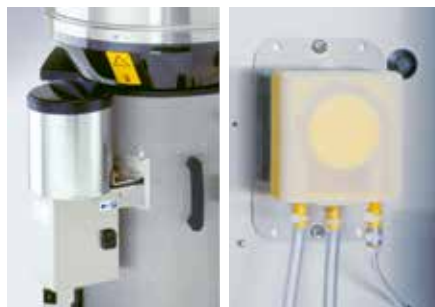
GROUP PENS. WHO LIKES TO EAT OR BE ALONE?

OPTIONS FOR THE OPTIMUM FEEDING SYSTEM



Automatic calibration system

Fluctuating bulk weight of milk substitutes can lead to changes in the concentration. In the worst case milk replacer deficits lead to poor weight gain or diarrhea while excess milk replacer consumption leads to unnecessarily high feed costs. The patented calibration scale beneath the mixing container automatically checks the dosage weights of all feed components during feeding and adjusts it if necessary.



Additive doser for liquid and powdered supplements

With the powder additive doser, highly concentrated supplements are administered in precise gradations by the gram. The powder container has a large capacity (up to 4 kg). This is especially convenient for supplements dosed in larger quantities, e.g., electrolytes and dietary supplements. The exact and reliable dosing of liquid additives is possible via the liquid additive doser.



SynchroFeed – 4-pump module

Thanks to four servo-actuated hose pumps, feed can be dispensed to up to four feeding stations simultaneously. The required quantity is determined and delivered to the appropriate calf. The pumps allow easy drinking also at up to eight meters distant feeding stations. This allows you to feed up to 120 calves using just one automatic feeder. The SynchroFeed-module is also available for one feeding station.



Flex 100 stand partition

This highly stable stand partition endures even the roughest conditions in the pen. The open design gives calves a wide-perspective view when drinking. This significantly reduces stress associated with accessing the feed stand. The various antenna installation options (left, right or front) further augment the flexibility of the stand partition.



MultiReader identification

MultiReader identification is designed for the high-traffic areas in the calf pen. The feeding pump can be started immediately after identification by means of buttons integrated in the antenna housing. The additional integrated LED provides information about feed entitlement and identification status. This is especially important and convenient if the automatic feeder display is not visible from the calf area.



Teat cleaning

The teat cleaning functionality is an add-on for calves in group penning. By means of a pump and two nozzles, the teat is rinsed and cleaned from outside after feeding using water or cleaning additives. The cleaning process is performed automatically whenever a calf stops feeding. The start times and cleaning duration can be set using a control unit.



CalfProtect

CalfProtect is a feeding station add-on that can be easily retrofitted onto existing systems and which allows calves to rest for a certain time after feed intake. Once a calf that is entitled to feed enters the station, the mesh gate automatically closes by means of a pneumatic cylinder. This protects calves from being suckled by their pen companions.



Fresh milk container with stirrer

The stainless-steel fresh milk container holds 120 or 200 liters while the fully automatic mixer is equipped with interval control. The deep outlet ensures full drainage and easy cleaning. An integrated ball valve facilitates operation.



GROUP PENS. WHO LIKES TO EAT OR BE ALONE?





TIP:

CalfApp
Download for IOS
and Android.



CalfApp & CalfCloud

The latest technology allows you to dispense with your routine work and fixed times for animal care. Förster-Technik is committed to providing functionality through apps and the internet, to access information anywhere and at any time. You have access to all the key data on your smartphone, wherever you go. No arduous learning process is required to start accessing and operating the automatic equipment. Easily view under www.calf-cloud.com



KalbManagerWIN

The PC program KalbManagerWIN allows you to conveniently take full advantage of animal control using tables and graphs, right from your desk, and access an overview of the entire raising period just by clicking the mouse. KalbManagerWIN always gives you online access to the current data from the pen. At the same time KalbManagerWIN offers you the ability to network multiple automatic feeders with one another.

PRACTICAL TIPS



PENNING

Light-filled pen with excellent air quality. Daily strewing of bedding. Clean the pen thoroughly after changing pens.

FEED

Use high-quality products (fresh milk or milk replacer) at a constant feed temperature of 39°C. Also offer water and concentrate.

FEEDING

Monitored ad libitum feeding until the 40th day of life (40FIT) with subsequent continuing weaning.

CLEANING

Clean and disinfect all used tools daily.

MONITORING

At least 2x daily visual inspection of all calves and of the feeding equipment used. Mark and/or note down conspicuous animals

FEEDING TECHNOLOGY

Automatic feeder: up to 30 calves per feeding station. Smaller groups are recommended

HYGIENE

Wash hands and clothing regularly.

ACCUSTOMING NEW CALVES

Before changing an animal's pen in the group, do not feed it. Lead it carefully to the teat two to three times. NOT too often! Let it alone while drinking.



GROUP PENS. WHO LIKES TO EAT OR BE ALONE?



GROUP PENNING: THE GRAF FAMILY

FARM PROFILE

Farm Manager:
Mr. Graf and Mr. Riede

LOCATION, STATE:

Hilzingen/Baden-Württemberg

FARMING TYPE

Animal production
(dairy cattle + breeding)
Plant production

ANIMAL BREED

Holstein

NUMBER OF DAIRY COWS

120

NUMBER OF CALVES PER YEAR

120

CALF FEEDING EQUIPMENT

1 automatic feeder with 2 feeding
stations

AUTOMATIC FEEDER IN USE

since 2007

"We integrated an automatic feeder into our farm in 2007. Penning the animals in groups allows the calves to play naturally. The calves often lie together, especially in winter.

Calves observe each other closely. This has a positive influence on concentrate and roughage intake, in particular."

Familie Graf



THE AUTOMATIC FEEDER AT BAKKER FARM

Förster-Technik automatic feeders have been in use for calf raising for more than eight years at Bakker Farm in Ontario, Canada. Gerda Bakker is responsible for the calves and achieves excellent results with two automatic feeders for 70 calves.

"The calves grow very well with the automatic feeders. It's easy to monitor and control the consumption quantities, feeding speed and number of visits. The automatic feeder saves me a lot of work on a daily basis. Our calves are very healthy. I would never want to be without an automatic feeder."

Gerda Bakker

FARM PROFILE

Farm Manager:
Bakker family

LOCATION, STATE

Listowell, Ontario, Canada

FARMING TYPE

Animal and plant production

ANIMAL BREED

Holstein

NUMBER OF DAIRY COWS

350

NUMBER OF CALVES PER YEAR

350

CALF FEEDING EQUIPMENT

Two automatic feeders

AUTOMATIC FEEDER IN USE

since 2007





WEANING. HOW YOU'VE GROWN ...!



CONCENTRATE-DEPENDENT WEANING ENSURES INDIVIDUAL ENERGY NEEDS ARE MET

In calves of normal weight, the weaning process can begin in the sixth week. Yet not all calves may yet be consuming sufficient concentrate. They increase their concentrate consumption rapidly, however, when the milk amount is reduced.

Studies show that calves weaned at 8 or 12 weeks were ruminating intensively as early as the tenth week. At 16 weeks, mastication and rumination periods are at the level of mature animals.

There are great differences in individual animal development in a calf's young life. Weaning works best when done using an automatic feeder, depending on concentrate consumption. This means the daily milk quantity is reduced not by age, but rather according to the amount of concentrate con-

sumed. Feed intake is only stopped when the calf is consuming sufficient concentrate (approx. 1.8 kg daily). One study demonstrated that after 80 days, more than 60 % of traditionally-weaned calves were still suckling one another, while the rate was only 35 % for animals weaned based on concentrate consumption. The average weaning age was 91 days, however exhibits a large range (71 to 108 days). This shows the degree to which individual development capacity of calves differs and that suckling and feeding behavior mutually influence one another.

Calves weaned based on concentrate consumption gained weight during all phases of raising. Growth was not reduced, in contrast to calves weaned based on age. At three weeks after weaning, no differences in rumen devel-



opment were observed between the two groups. The number and surface of rumen villi were the same. Weaning based on concentrate consumption

ensures that the energy needs of each calf are met at all times, for optimal rumen development.



WEANING. HOW YOU'VE GROWN ...!

PERFORMANCE CONTROL MADE EASY



Concentrate feeder

Feeding a high-quality concentrate is recommended as early as possible. At the concentrate feeder, the calves receive concentrate that is fresh and adjusted individually to them. The amount consumed is registered in the automatic feeder and can also be displayed there. Once concentrate consumption reaches a certain threshold, e.g. 1 kg per day, the feed quantity is automatically reduced. The automatic concentrate feeder has a capacity of up to 70 kg depending on the type of concentrate used and keeps it fresh longer.



Electronic animal scale

With the electronic front-feet animal scale in the feeding station, you can easily track and monitor each individual calf's weight as they grow. Based on weight development, every animal can be apportioned feed individually; including consumption of concentrate and TMR – which enables weaning based on the level of development. The result is more homogeneous herds in young cattle raising and milk production.



1-2-3 animal scale

The mobile "1-2-3 animal scale" is equipped with an antenna, which reads animal numbers and allows for their correlation with animal weight. The integrated control unit with a large, lit display shows the weights of the animals, with the option to save the weight by animal number. Data can be transferred to a PC as a CSV file using a USB stick. The data can then be evaluated in Excel or uploaded onto KalbManagerWIN, and



from there transferred to the automatic feeder. The large integrated wheels and battery power supply mean it can be easily relocated to different places.

AUTOMATIC FEEDER IN USE BY THE MAYER FAMILY IN ENGEN

"I can now view all the data right on my computer. In addition to feeding behavior, I can now also see how much concentrate my calves are consuming. Initiation of weaning based on concentrate consumption means that calves continue to gain weight even during the weaning period."

Jan Mayer



FARM PROFILE

Farm Manager:
Jan Mayer

LOCATION, STATE

Engen/Baden-Württemberg

FARMING TYPE

Animal production
(Dairy cattle + breeding):
Plant production

ANIMAL BREED

Simmental

NUMBER OF DAIRY COWS

200

NUMBER OF CALVES PER YEAR

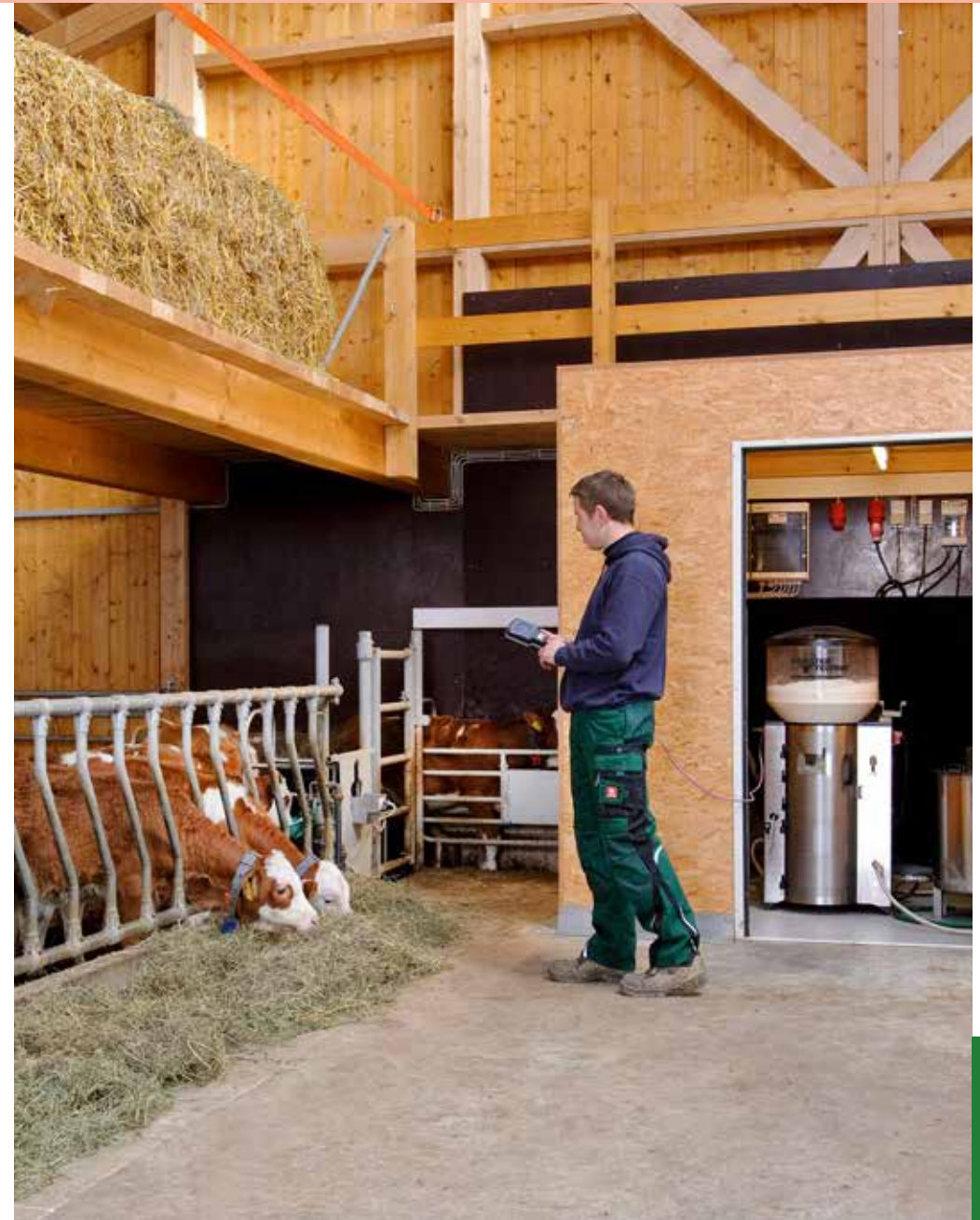
200

CALF FEEDING EQUIPMENT

One automatic feeder for two
group stations, concentrate feeder

CONCENTRATE FEEDER IN USE

since 2000



START NOW INTO
HEALTHY GROWTH.

